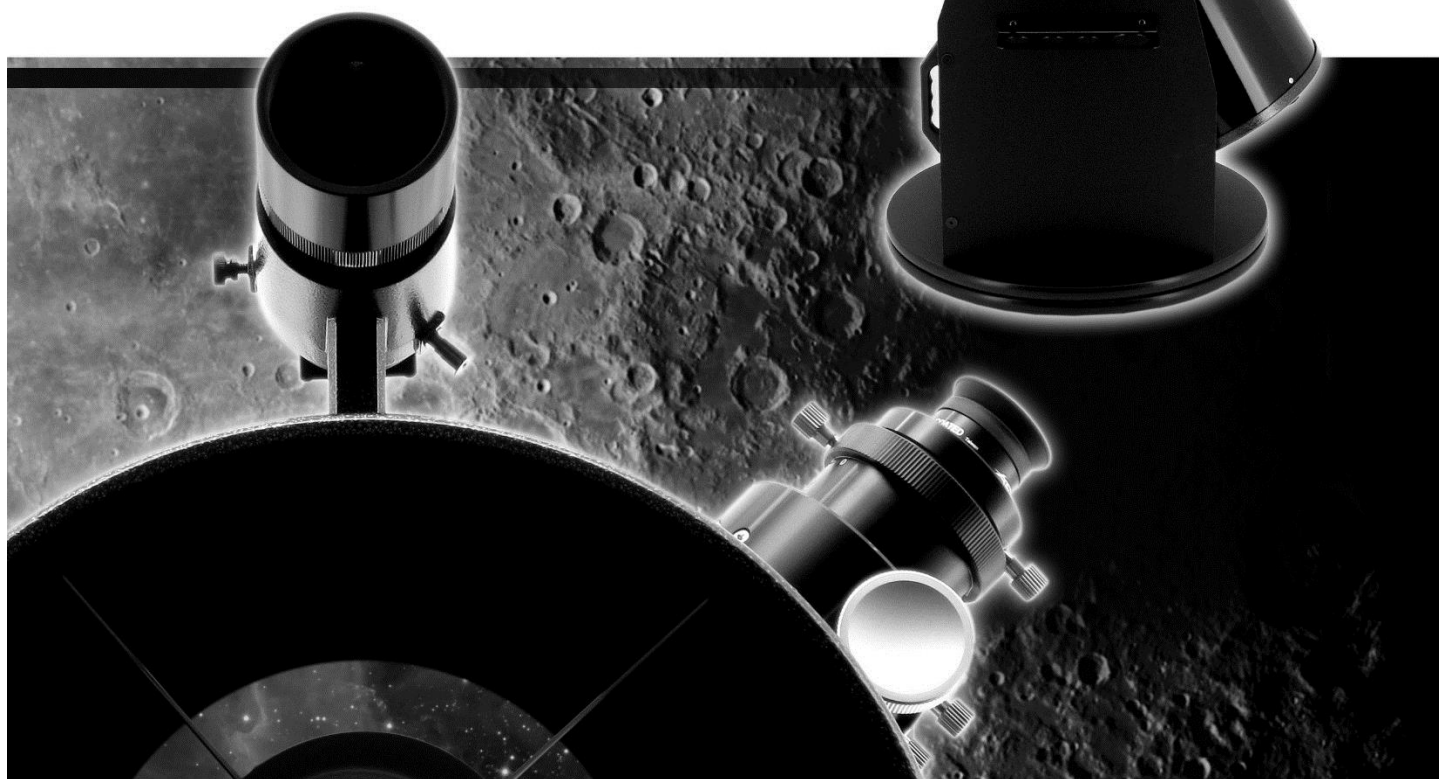




# **Dobsonian Telescope Owner's Manual**





## CAUTION!



**NEVER** ATTEMPT TO LOOK AT THE SUN WITH YOUR APERTURA™ DOBSONIAN TELESCOPE **UNLESS** YOU HAVE A **FULL-APERTURE SOLAR FILTER** (NOT INCLUDED WITH TELESCOPE) INSTALLED OVER THE OPEN END OF THE OPTICAL TUBE. NEVER USE AN EYEPIECE-MOUNTED SOLAR-FILTER ALONE AND ALWAYS COVER THE FINDERSCOPE EYEPIECE WITH A PLASTIC DUST CAP. WITHOUT A FULL-APERTURE SOLAR FILTER INSTALLED, YOU RISK SEVERE EYE DAMAGE AND PERMANENT BLINDNESS!



Please take a few minutes to read over the assembly instructions to familiarize yourself with the individual parts and procedures before attempting to assemble your Apertura™ Dobsonian Telescope.



Before using your Apertura™ Dobsonian Telescope, please review and follow the “Procedure for collimation” section of this manual. You must properly collimate your telescope to achieve optimal viewing through this quality optical instrument.



# **DOBSONIAN TELESCOPE**

**Assembly Instructions and User's Guide**

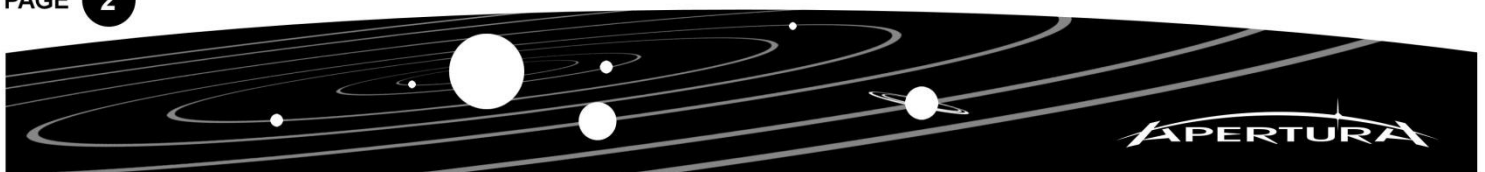
## Unpacking your Apertura™ Dobsonian Telescope

### Parts list:

#### Optical Tube Box (package 1 of 2)

Dobsonian optical tube  
8x50 90-degree right-angle finderscope  
Plastic tube cover  
Laser collimator  
2 silver side bearings  
Fan power pack (batteries not included)

Eyepieces:  
30 mm (2" format)  
9 mm (1.25" format)  
2"-to-1.25" eyepiece adapter  
35mm Extension Tube  
Moon filter (1.25" format)



## Base Mount Box (package 2 of 2)

### Wood components:

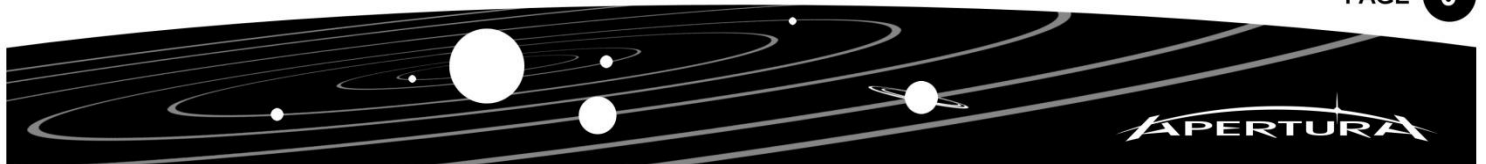
- 1 small panel – front
- 1 large panel – right
- 1 large panel – left
- 2 large round base plates

### Turntable hardware:

- 1 round plastic roller-bearing disc
- 2 metal discs
- 1 Four-hole eyepiece tray
- 1 handle
- 3 black plastic feet
- 1 Allen wrench

### 1 adjustment knob assembly:

- 1 bolt with knob head
- 1 large washer
- 1 small bearing washer
- 1 small washer
- 1 axle sleeve
- 10 long black Allen screws  
(only 8 screws for the AD8 model)
- 2 medium silver Allen screws
- 3 medium Phillips screws
- 2 short black Phillips screws



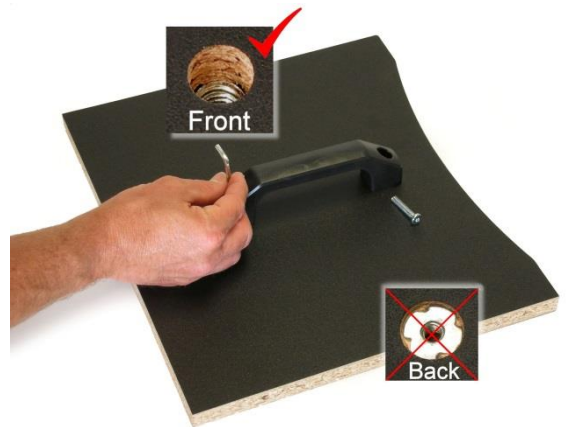


## Assembling the DOBSONIAN BASE HOUSING

### STEP 1

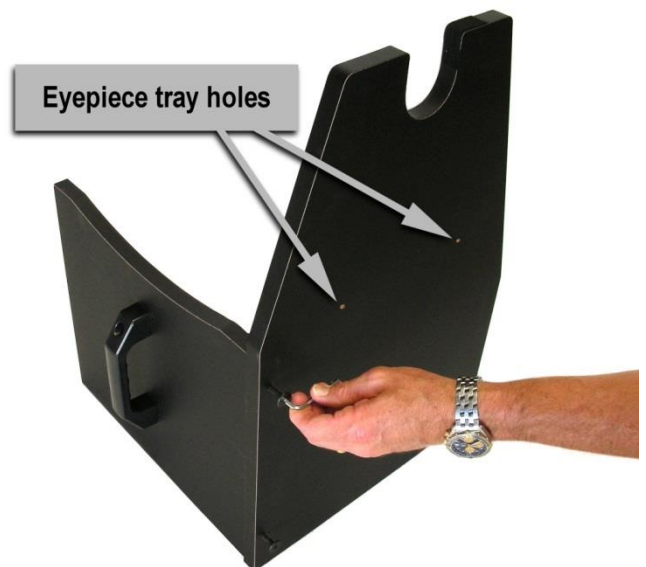
Attach handle to the BASE FRONT with two medium silver Allen screws. The curved edge of the board is the top of this part when vertical.

**! IMPORTANT !** Make sure the flat face of the embedded T-nuts are on the BACK side of the board (opposite the handle).



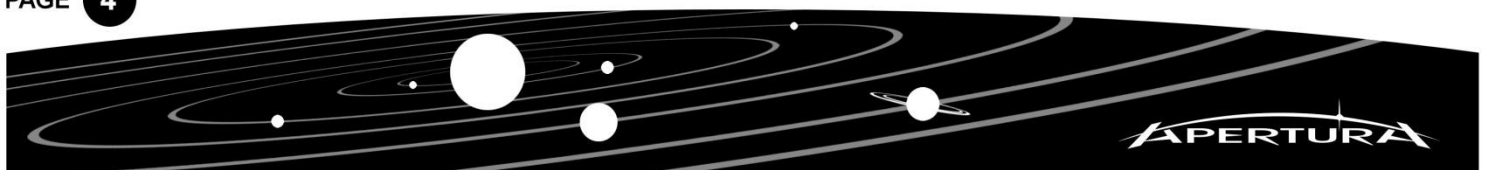
### STEP 2

Attach BASE RIGHT to BASE FRONT with two long black Allen screws. (The BASE RIGHT is the one with two smaller pre-drilled holes for the eyepiece tray)



### STEP 3

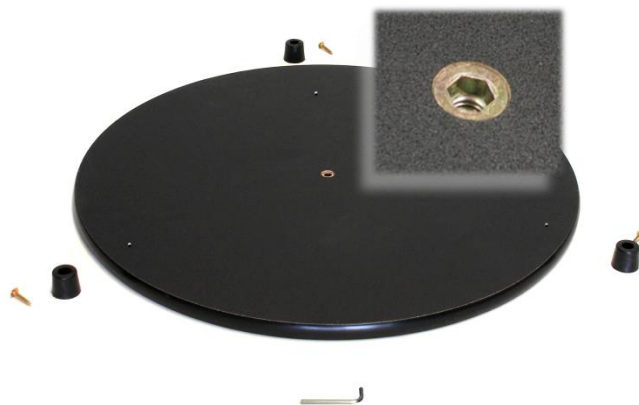
Attach BASE LEFT to BASE FRONT with two long black Allen screws. Be sure all three sides are secure.



**STEP 4**

Locate the BOTTOM BASE PLATE.

The BOTTOM BASE PLATE has 3 holes around its edge and a brass fitting in the center hole.



Attach the 3 feet to the BOTTOM BASE PLATE's bottom side with 3 medium Phillips screws, with the wider side of the feet facing the board.

*(The bottom side of this plate has the brass fitting almost flush with the surface – see inset picture)*

**STEP 5**

Locate the TOP BASE PLATE.

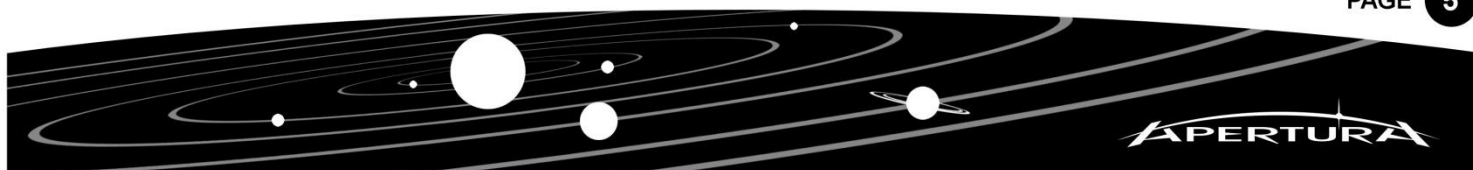
The TOP BASE PLATE has several holes around its edge (not counting center hole).

Model **AD8** = 4 holes

Model **AD10, AD12** = 6 holes

Turn the completed BASE HOUSING upside down.

Align the holes of the UPPER BASE PLATE with the holes of the BASE HOUSING.



STEP

6

Screw long black Allen screws through the BOTTOM BASE into the BASE HOUSING making sure the side with the recessed holes is facing away from the BASE HOUSING.



STEP

7

Place BOTTOM BASE PLATE with feet facing down. Insert AXLE SLEEVE into the Center hole.

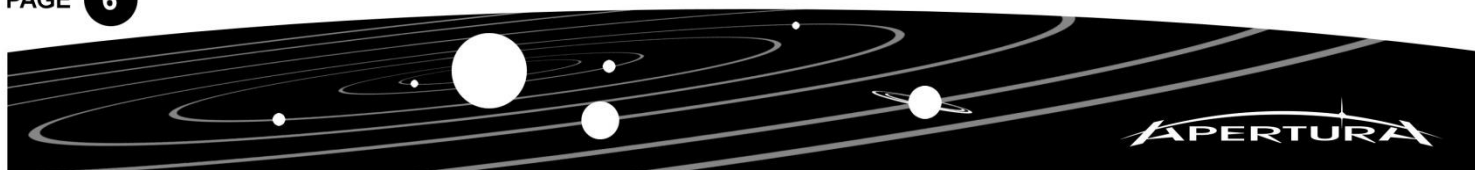


STEP

8

### ROLLER BEARING ASSEMBLY

Place one of the two METAL DISCS on the BOTTOM BASE PLATE aligning the AXLE SLEEVE to hole in the Center.  
*(It can be flipped either way)*





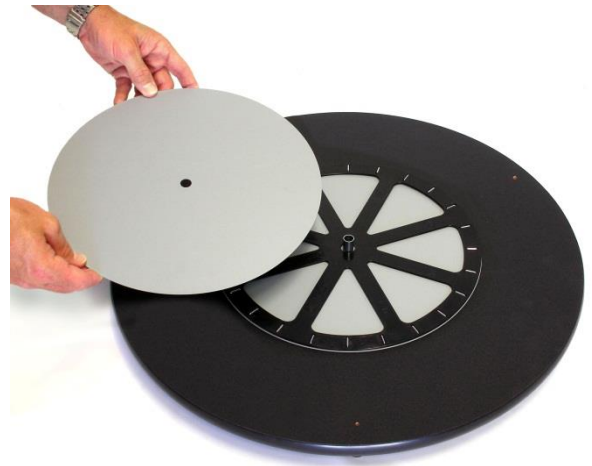
Now place the ROUND PLASTIC ROLLER-BEARING DISC over the first METAL DISC.

*(It can be flipped either way)*



Follow this with placing the second METAL DISC over the ROLLER-BEARING DISC.

*(It can be flipped either way)*



STEP

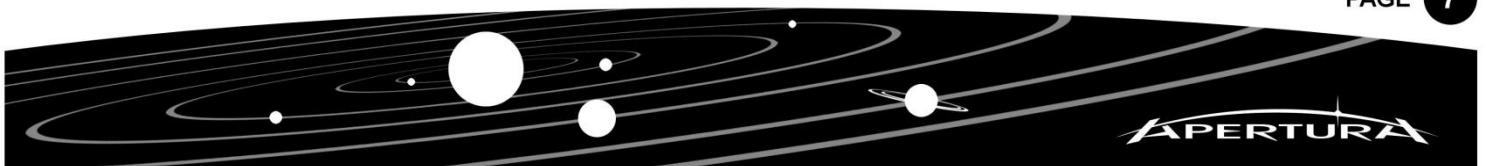
9

Pick up the BASE HOUSING with UPPER BASE PLATE already attached and place it onto the AXLE SLEEVE of the BOTTOM BASE PLATE.



PAGE

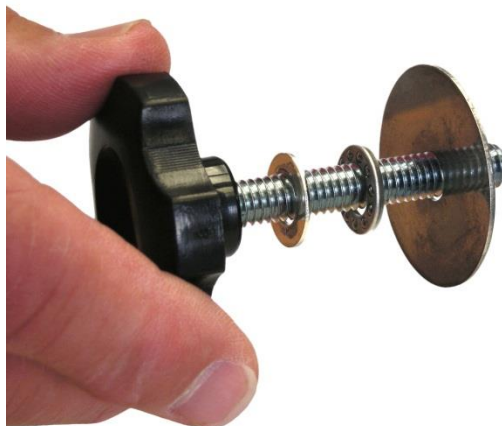
7



**STEP 10**

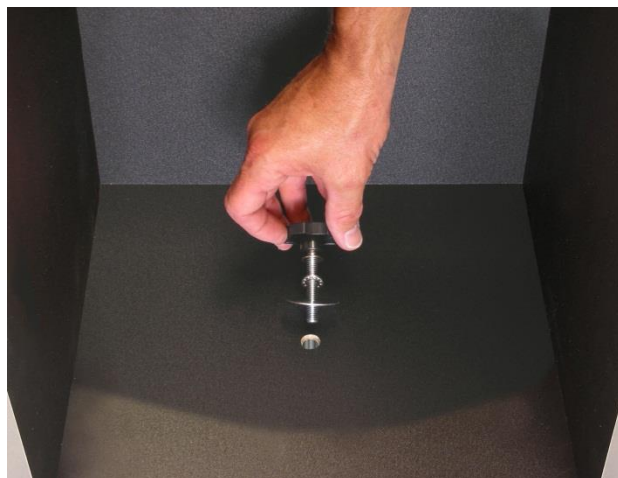
Assemble washers onto the  
ADJUSTMENT BOLT in this order:

Small washer  
Ball bearing washer  
Larger washer

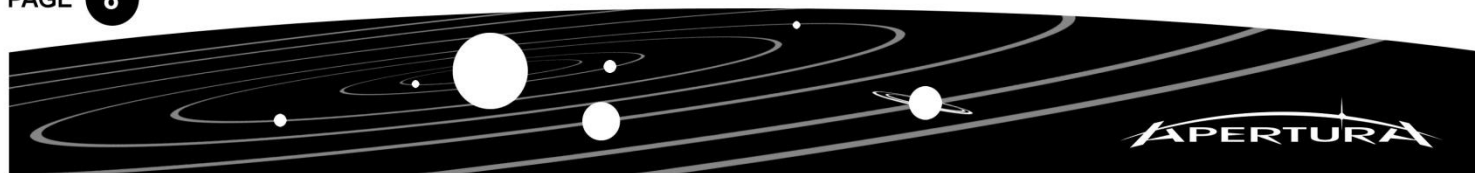


Thread the ADJUSTMENT BOLT  
through all of the assembled base  
parts. Tighten the knob until it feels  
firm but not too tight.

**TIP:** Tightening or loosening this  
knob is how you will adjust the  
amount of effort it takes to rotate  
your Apertura™ Dobsonian  
telescope on its base.

**STEP 11**

Attach the 4-HOLE EYEPIECE TRAY  
to the BASE RIGHT panel of the  
BASE HOUSING ASSEMBLY using  
the two pre-drilled holes and two  
small black Phillips screws.



## Assembling the OPTICAL TUBE

**STEP 1** Remove (2) bolts located on each side of the OPTICAL TUBE

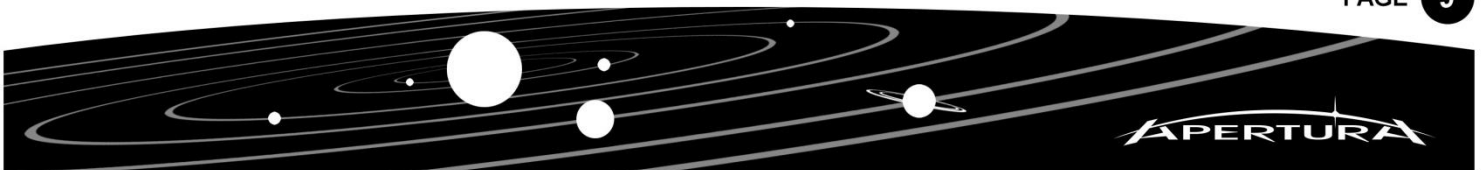


**STEP 2** Align SILVER SIDE BEARING ASSEMBLY with the same holes and insert the top bolt first (do NOT tighten yet). Then slide the BEARING ASSEMBLY up if necessary and insert the bottom bolt.



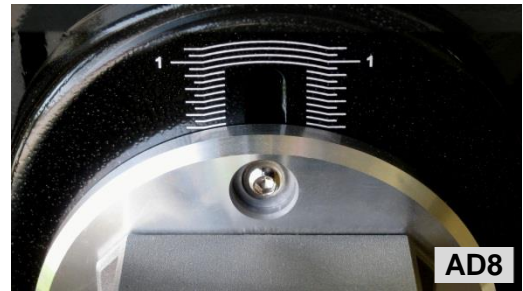
Repeat on the other side of the OPTICAL TUBE.

The position of these BEARING ASSEMBLIES will determine the balance point of your telescope and may need to be adjusted depending on what accessories are installed on your optical tube.

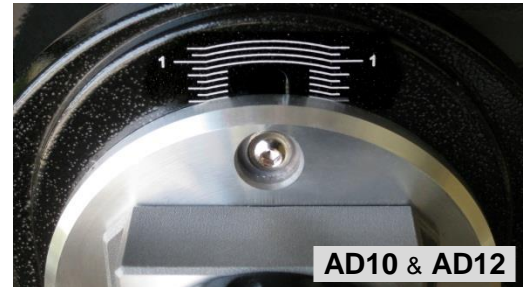




With the included accessories attached to the Apertura Dobsonian Telescope, balance is achieved with these initial settings (see pictures).



**NOTE:** When other accessories are attached to the OTA, the balance point may change and appropriate adjustments to these settings may be required.



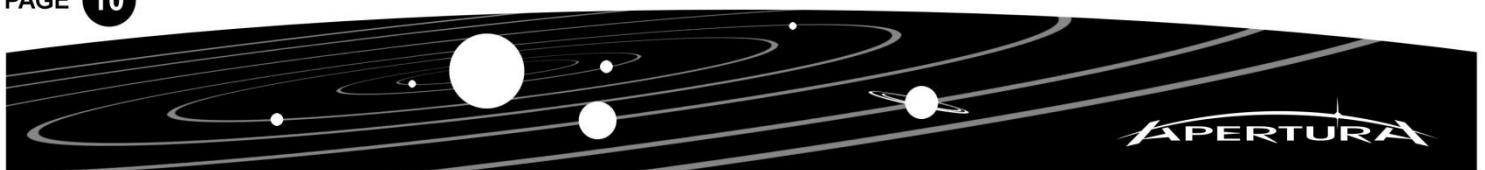
### STEP 3

Move the OPTICAL TUBE over onto the BASE HOUSING assembly.

**TIP:** The metal seam of the telescope tube should be turned to the side of the base that has the handle (BASE FRONT).

**TIP:** The flat sides of the SILVER SIDE BEARING ASSEMBLIES should be facing up (flat).

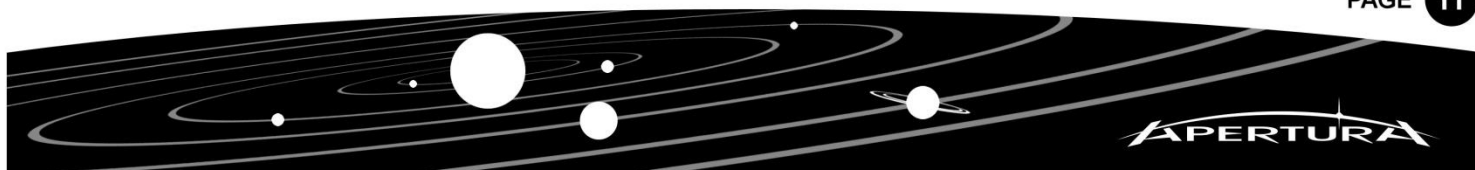
**TIP:** Tightening or loosening the black, plastic knobs of the side bearing assemblies is how you will adjust the tension of the bearings. If excessive tension is required to balance the telescope (e.g. because of heavier eyepieces/accessories), then you may need to adjust the balance point of the bearing assemblies as described in Step 2 above.



**STEP****4**

Locate the 90-DEGREE RIGHT-ANGLE FINDERSCOPE and attach it to the dovetail finderscope bracket on the side of the OPTICAL TUBE.

Use the thumbscrew to tighten the finderscope into place.



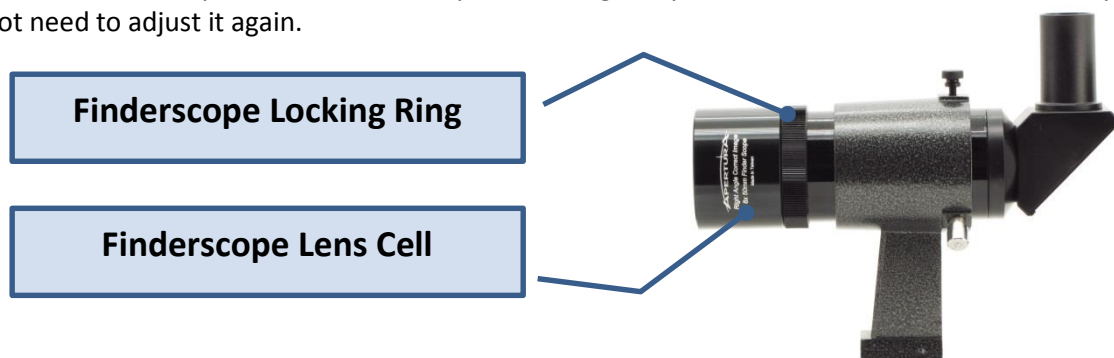


## Aligning Your Finderscope

When first attached, the finderscope will not be perfectly aligned with the telescope's optics. Once the finderscope is properly aligned with the main telescope's view, the finderscope's extra-wide field of view will help you easily center the main telescope on objects you wish to view.

**1** Start by inserting the large 30mm eyepiece into the telescope's focuser. Point the telescope at a large, distant and stationary object (such as the detail on a billboard at least 250 yards away). Focus the eyepiece and center that distant object in the eyepiece; in other words, start with an earthbound object for focusing and alignment. If you are not able to achieve good focus, you may need to insert the included 35mm Extension Tube into the focuser and then insert the 30mm eyepiece into the extension tube. The 35mm Extension Tube is used with low-power eyepieces to extend the focal length, making it possible to focus at low magnification.

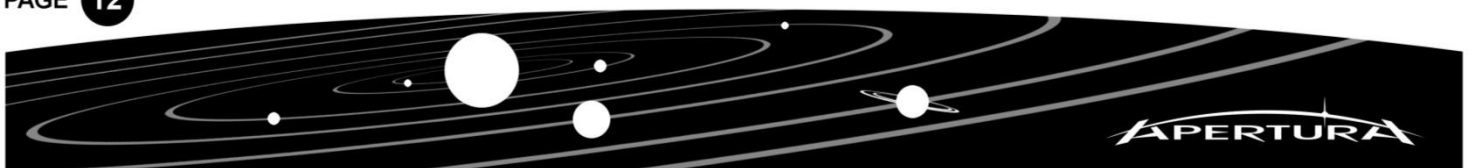
**2** Now look through the finderscope. To focus the finderscope, first loosen the lens cell by unscrewing it a half-turn. Then turn the locking ring the other way, to pull it back from the lens cell and expose the maximum number of threads on the finderscope body. Turn the lens back and forth to focus your view. Once the lens is focused, then tighten the locking ring to hold the lens cell in place. You may need to make a slight focus adjustment the first time you use the finderscope on the night sky, but once the focus is set on the sky you should not need to adjust it again.



**3** Once focused, then align your finderscope by gently adjusting the two thumbscrews on the finderscope bracket (the silver "knob" contains a spring that gives back-pressure to the thumbscrews and does not need adjustment). Carefully align the finderscope body until its crosshairs are centered on the object that is currently centered in the main telescope's eyepiece.



**4** If you bump the finderscope during transport or use and disturb its alignment, it will only require a quick and easy adjustment of the two thumbscrews to realign the finderscope to the main telescope's view.



## 10:1 Precision Micro Crayford Style Focuser

Your Apertura Dobsonian Telescope comes standard with a Dual-Speed 10:1 focuser. It is pictured here with the drawtube fully extended.



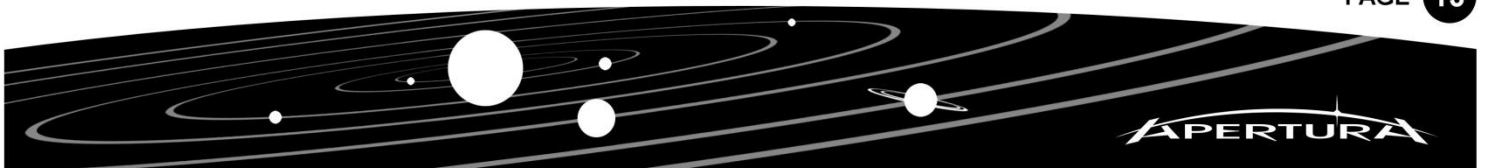
The Apertura focuser will accept 2" and 1.25" eyepieces (with included adapter) and other common hardware. The amount of extension required for each eyepiece will vary, therefore retract or extend the drawtube to bring the image into focus. For lower power, wide field-of-view (FOV) eyepieces, it may be necessary to increase the focal length by fitting the **35mm Extension Tube** into the focuser as an adapter to achieve focus.

The scale on top shows the focuser drawtube fully extended to 4cm or 1.5". **!! IMPORTANT !!** Locking screw (under tensioning screw) must be backed out to allow full drawtube travel.



The movement of the focuser tube is a result of tension inside the focuser which can be adjusted by the tensioning screw. In general, use the lightest amount of tension that will work with the installed components for smooth action. But as heavier eyepieces are used, especially in conjunction with other components, increase the tension to compensate for the extra weight.

Once you achieve focus, you may want to use the locking screw to hold the focuser in place even if the adjustment wheels are moved. This is helpful when exchanging parfocal eyepieces or having other viewers come to the eyepiece.



## Eyepiece Selection

Your Apertura™ Dobsonian Telescope comes standard with two eyepieces: a 2" diameter wide field, low-power eyepiece with a 30mm focal length and a 1.25" diameter high-power eyepiece with a 9mm focal length. To get the best results from your telescope, always start with your widest field (lowest power) eyepiece, then work your way up to the higher power eyepiece, keeping the image centered throughout.

**35mm Extension Tube:** This is used with low-power eyepieces to extend the focal length, making it possible to focus at low magnification. The 35mm Extension Tube fits into the 2" opening of the focuser and then accepts 2" eyepieces, or 1.25" eyepieces with the 1.25" adapter installed.

Deep-sky objects are best observed with medium magnification due to their dimness at higher magnifications. Astronomical points of interest within our solar system are good candidates for higher magnification because they are generally brighter than deep sky objects. Of course, experimentation is always the most rewarding approach to determining eyepiece selection.

## Observation Tips

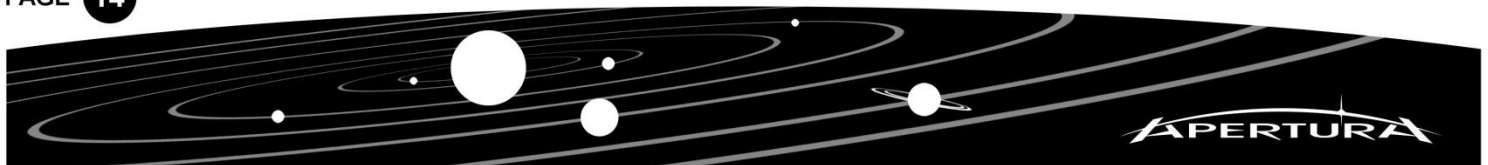
Your telescope will perform best when local artificial lighting is kept to a minimum. Nearby streetlights and lighted buildings cause a lot of light pollution and will degrade the quality of your view with your telescope.

When choosing a viewing location, try to find a spot far away from tall structures with a wide view of the open sky.

Allow your eyes time to adjust to the darkness before you expect to see any faint objects of the night sky. Usually 30 minutes is long enough for your eyes to totally adapt to the dark. Preserve your dark-adapted vision by avoiding looking at sources of light (street lights, cell phones, computers, etc.). If you are exposed to a light source, the adjustment period will begin again. After your eyes have reached their dark-adapted state you'll want to consider using a red-lens light source for activity in the dark.

## Acclimating Your Telescope

Before using your telescope, you should allow its temperature to equalize to that of the



ambient outside air temperature outside. Larger scopes take longer to equalize and should be given half- to one-full hour depending on the temperature difference (one hour for a difference of 40 degrees Fahrenheit). Keeping your telescope and optics in an outside or non-environmentally controlled building such as a garage or shed can decrease the time it takes for the temperature differential to stabilize. To aid in equalizing the temperature of your Apertura™ Dobsonian Telescope, plug in the onboard fan. The fan pulls in outside air to more quickly stabilize the internal temperature of the scope, especially the large primary mirror.

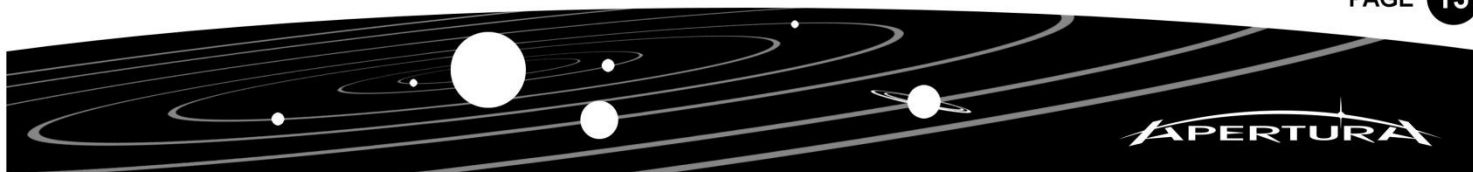
## Viewing Conditions

The quality of the conditions for viewing are referred to as “seeing,” usually rated on a scale of 1 to 10, with 10 as perfect seeing and 1 as very poor. There are two major conditions to notice in evaluating viewing conditions on any given night: *atmospheric disturbance* and *air transparency*. The best conditions for astronomical viewing are when atmospheric disturbances are at a minimum. Lower your expectations when trying to use your scope too early in the night or trying to focus on objects close to the horizon as this will impair your ability to view clearly. Generally, you want to set your telescope up on the highest point possible as it affords the highest quality viewing and isn’t as subject to atmospheric disturbances. A good way to determine how well you will be able to see on any given night is to look at bright stars about 40 degrees above the horizon and look for twinkling of stars. Twinkling is caused by atmospheric disturbances and is an indicator that quality viewing may be difficult. Though, often what twinkles near the horizon will become steadier later in the evening as it moves higher in the night sky.

Also affecting the viewing quality is the transparency (clarity) of the air. Remember that our viewing of the universe from the ground begins by looking through many miles of air that is full of particles and water which is in constant motion and changes regularly.

## Tracking Celestial Objects

Since the Earth is always rotating, astronomical objects will appear to move across the night sky. When using your Apertura™ Dobsonian Telescope for a little while, you need to manually track the observed objects by carefully moving the scope’s tube to keep the



object relatively centered in the eyepiece. Using higher magnification means that you have to make more frequent tracking adjustments than when using lower magnification.

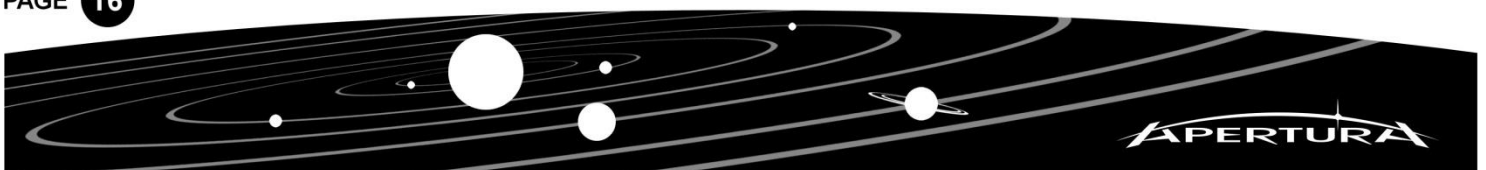
A popular method for locating night sky objects is called “star-hopping.” Start by finding a known star or moon or planet, and scan from there to other stars closer to the destination object. This method is far from new but it might take a little time to master requiring at least a rudimentary familiarity with the location of a variety of celestial objects. However, learning to star-hop makes object location much quicker and gets you to where you want to be without much fuss. Experience will make this easier and dramatically increase your personal knowledge of the night sky! You don’t need to memorize every single object in the night sky, but it can be very rewarding just knowing a handful of the most prominent sights such as the Orion constellation, the Big Dipper, the North Star, etc.

A star chart will help you determine which constellation your target object is near. Find the brightest star in that constellation and place it in the center of your eyepiece. Again refer back to your star chart to figure out the next brightest star as you gradually move towards your intended target. If you are unsuccessful at first, please be patient and repeat the steps until your final destination is in view. Again, your speed will increase with experience.

### Procedure for collimation

**CAUTION: Do NOT allow the laser to shine in your eye (either directly or indirectly off the telescope’s mirrors) as that may damage your eye permanently.**

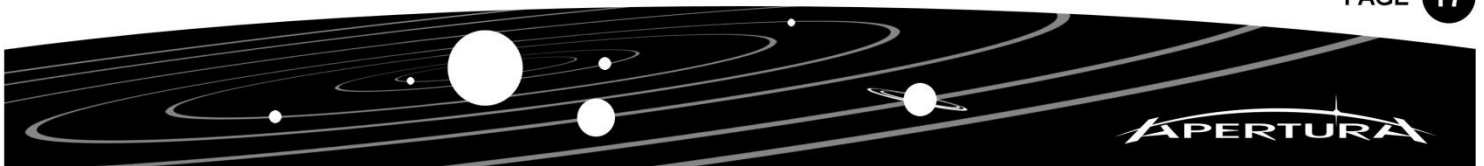
1. Remove any eyepiece from the focuser.
2. Look into the focuser and confirm that you see the secondary mirror centered in the hole. Reflected in the secondary mirror, you should be able to see the primary mirror and the three small clips around the edge of the primary mirror. If not, you will need to rotate the secondary mirror assembly with your hand (be careful not to TOUCH the reflective surface of the secondary mirror itself) until the reflection of the primary mirror is centered in the secondary mirror. In addition, although





the shape of the secondary mirror is actually oval, when properly aligned it will *appear* to be circular as viewed through the focuser.

3. Insert the laser collimator into the 2" adapter sleeve and then insert that into the focuser. Secure the laser collimator with the thumbscrew. Turn on the laser collimator and rotate its target face toward the back end of the scope (the primary mirror end).
4. Hold up a piece of paper in front of the telescope to see if the laser is missing the secondary mirror on reflection. If the laser isn't reflected onto the paper, then most likely it is hitting the secondary mirror as it should.
5. Carefully peer into the tube to see where the laser is hitting the primary mirror below. **CAUTION: Do NOT allow the laser to shine directly into your eye from the telescope's mirrors.** The laser should be shining in the middle of the small donut ring in the middle of the primary mirror. If it is not, adjust the tilt of the secondary mirror using the three small screws on the top of the secondary mirror assembly until the laser is centered in the donut ring on the primary.
6. Now view the target face on the laser collimator to see if the laser is hitting anywhere on the target face. If not, then this simply means that the primary mirror is far enough out of adjustment that the laser is outside the target face on the collimator. In either case, you will need to move to the bottom end of the scope and loosen the large white locking knobs. Then adjust the angle of the primary mirror with the large black adjustment knobs until the laser becomes centered in the hole in the middle of the laser collimator's target face.
7. Once accomplished, lock the primary mirror assembly with the white knobs. This may cause some minor movement of the mirror, so continue fine adjustments until all six knobs are firm and the laser is centered on its target.



## Keeping your telescope clean

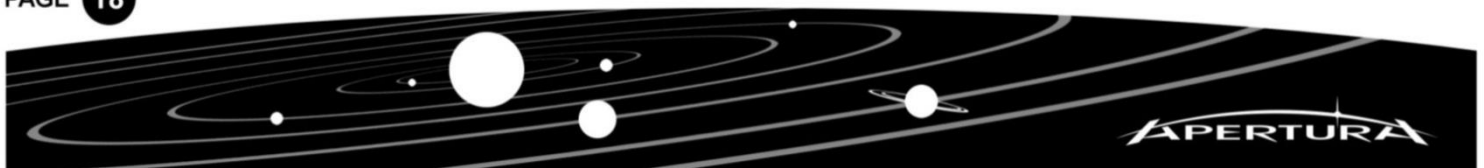
Do not touch, rub, brush, wipe or otherwise contact the *primary mirror* or *secondary mirror*. Over time a thin layer of dust will accumulate on the surface of these mirrors. This is normal and is best left alone. If it is absolutely necessary, use only an optical lens brush and lens bulb puffer to remove dust from your mirrors.

The outside of your Apertura™ Dobsonian Telescope is easily cleaned with a dust cloth or sponge for fingerprints, dust, etc.

Clean other components **ONLY** when absolutely necessary and then **ONLY** with a mild soap solution and lint-free cloth by gently blotting. Do not use any harsh cleaning chemicals to avoid damaging the finish on your telescope and components.

Use a dry soft cloth to remove condensation from the outside of you telescope before storing it. Do not try to dry the eyepiece or finderscope lenses but rather let them dry naturally.

Avoid leaving your telescope in an excessively hot environment such as the inside of a car as high temperatures can damage your telescope in several ways.



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